Has the East African Community Regional Trade Agreement Created or Diverted Trade? A Gravity Model Analysis

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Abstract

The paper investigates the potential impact of the EAC trade agreement (a south-south Regional grouping) on trade creation and diversion. The paper seeks to establish whether the EAC RTA has diverted or created trade using an expanded (augmented) gravity model. The paper departs from the conventional estimation approach that uses average combined trade flows as the dependent variable which is prone to errors and uses exports. We estimate static and dynamic random effects models using a panel data set from 2001 to 2011 on seventy countries that trade mainly with the EAC partner states. Results suggest that indeed the implementation of the EAC treaty has created trade contrary to widely held views that South-South RTAs largely divert trade. There is thus evidence that the EAC, a south-south RTA has been a more trade creating than trade diverting as espoused in the literature.

Keywords: Gravity model, imports, exports, intra and extra EAC, trade creation, trade diversion, trade flows, RTA, regional integration

1. Introduction

In the last two decades international trade has experienced dramatic increase in Regional Trade Agreements (RTAs). At least every country on the globe subscribes to some sort of a bloc and substantial amount of trade in the world takes place within such agreements. Trade liberalization has been an important part of East Africa's policy agenda since the countries embarked on liberalising their inter-state trade as part of the regional integration process. This is exemplified by the number of trade initiatives, specifically economic integration agreements that the region is involved in, such as the East African Community (EAC), the Common Market for East and Southern Africa (COMESA) and South African Development Corporation (SADC) for Tanzania.

The East African countries of Uganda, Kenya and Tanzania have a strong historical background. During the twentieth century, both before and after independence, there were a number initiatives for cooperation. In 1967 the three countries signed a treaty for East African Cooperation that established the EAC. Unfortunately in 1977 the EAC was officially dissolved after ten years due to various factors including; disagreements on revenue sharing, political and ideological differences and different levels of economic development. Following iterative negotiations, the EAC was revived in 1999 and effectively started in 2000. The main objective of the EAC is to attain economic, social and political integration in East Africa. The salient features of the EAC Treaty are articulated in Article 5 (2), which provide for the establishment of a Customs Union (CU) to be followed by a Common Market (CM), a Monetary Union and ultimately a Political Federation. Membership to the EAC expanded to five partner states after the western neighbours of Burundi and Rwanda joined the EAC in July 2007.

The main elements of the Protocol on the establishment of the EAC CU in 2005 were thus; removal of Internal Tariffs (IT) and all Non-Tariff Barriers (NTBs) on intra-EAC trade; introduction of Common External Tariff (CET); and agreement on a list of products classified as sensitive and therefore requiring additional protection. Article 25 of the EAC CU protocol highlights the commitment of partner states to support export promotion schemes in the community for the purposes of accelerating development, promoting and facilitating export oriented investments, producing export competitive goods and attracting foreign direct investment. Other

schemes include duty drawback, refund and remission of duties. It was anticipated that implementation of these provisions would increase the value and volume of intra-EAC trade, hence creation of trade. The question is whether the EAC has created or diverted (Note 1) trade during the implementation of the CU.

There are conflicting views with regard to trade diversion and creation in South-South RTAs. Yeats (1998) expresses a pessimistic view arguing that promoting intra-regional trade has potential adverse effects on member countries and on third party countries and have a negative effect on Africa's industrialization and growth. World Bank, (2000) argues that South-South RTAs generate trade diversion especially when CETs are high and the member states are poor. Others who hold similar views include Park (1995), and Schiff (1997). On the other hand Cernat (2006) argues that, South-South RTAs are not more trade diverting than other RTAs implying that it is case by case. This view is supported by Elbadawi (1997) who argues that integration in Africa is key to generating the threshold that can trigger the needed growth through complementarities. Using a Computable General Equilibrium model, Evans (1998) found a net positive effect of the Southern Africa regional integration initiative. Buigut (2012) uses a modified gravity model to estimate trade effects of the EAC CU on individual member countries and concludes that the CU has generated disproportionate impact on intra-EAC exports and imports.

There is thus lack of conclusive evidence with regard to trade creation and diversion pointing out the fact that the debate is ongoing deserving more empirical evidence. The paper seeks to establish whether the EAC RTA has diverted or created trade.

2. Theoretical and Empirical Literature

Trade theories explain why countries seek to integrate. Ricardo in the classical theory of trade argues that trade raises a country's potential income (welfare) compared to autarky through specialization according to comparative advantage. Therefore countries shift resources to production of goods where they efficiently produce and import goods where they are less efficient. Since in the real world, the existence of tariff and NTBs distort the final consumer price, regional integration overcomes this challenge. On the other hand Heckscher Ohlin (O-H) model explains international trade based on the country's factor endowments, that is, the relative quantities of capital and labour available for production. It assumes that countries have access to the same technology. Therefore countries with relatively large quantities of labour will shift production to labour-intensive production and export these goods and import capital-intensive goods. There has been renewed interest in regional trade agreements in the past decade especially after the Doha Round talks stalled. The debate questions, the impact of RTAs on partner states and third countries (see for example World Bank 2000; Yeats (1998; Schiff (1997; and Park (1995). The theoretical foundation to make such analysis is embedded in the Viner's (1950) seminal work which advanced the idea of ambiguous welfare effects that result from formation of an RTA.

When barriers are dropped, markets become enlarged giving more efficient producers' entry into countries where prices had artificially been high due to the duties and other trade barriers. This brings into play the concepts of trade creation and diversion. McIntyre (2005) argues that the assessment of the static effects of forming an effective RTA, hinges on three important principles from the theory of integration, namely; allocation/efficiency, competiveness and complementarity: Efficiency gains of economic integration depend on whether the products from partner states are in direct competition with, or complementary to each other. This means that considerable overlap in the range of commodities produced by partner members is critical for determining efficiency gains. The overlap should be accompanied by significant differences in production costs between members, to ensure leverage in terms of more efficient allocation of resources. The EAC partner states among themselves are likely to have a narrow range of exports of goods and services. This typically limits the scope for efficiency gains but does not eliminate them altogether.

Complementarity exists when partner states of an RTA produce commodities that do not compete, but rather complement. Complementarity is usually characterised by the usual trade diversion and trade creation. The trade agreements between the North and the South tend to complement, where the south produces inputs and the north produces final products owing to the limited processing capacities of the former. Of course perpetuating this kind of arrangement is at the disadvantage of the south. It is argued that because RTAs give preferential treatment to member countries, they divert trade from non-member, probably least-cost suppliers to members who are high-cost suppliers (Bhagwati and Panagariya, 1996; and Panagariya, 1998, and 1996). This is interpreted as an impediment to multilateral trade liberalization and as such trade diversion dominates trade creation. In instances where the rest of the world is the least cost supplier and faces constant costs, an RTA with the supplier who faces increasing costs diverts trade and the liberalizing country forfeits tariff revenue (Robinson *et al.*, 1993). In contrast, when the RTA partner is the supplier facing constant costs, there are benefits from the price reduction in

addition to tariff revenue from the countries excluded from the RTA. However, as Panagariya (1996) argues, usually the rest of the world, not the RTA partner, faces constant costs while RTA members face increasing costs. Therefore given such a scenario, whereas trade creation will take place for some commodities, for the goods coming from a partner with increasing costs — trade diversion will dominate the RTAs.

De Melo *et al.,* (1993) instead present a mild view arguing that integration both creates and diverts trade. Likewise, De Rosa (1998) provides a balanced view of the theoretical models which demonstrate both trade creation and diversion in a situation where an RTA is formed either with a partner facing constant or increasing costs. Furthermore, to prevent trade diversion, RTA member countries should reduce trade barriers with non-member countries as they do for members. Others have used theoretical models (Computable General Equilibrium) to analyse RTA impact given their advantage of being economy-wide and multi-sectoral models (see for example, Brown 1993; Francois and Shiells, 1994; Shinyekwa and Mawejje, 2013). It is evident in the literature that theoretical models give an ambiguous picture with regard to the net impact of an RTA on trade creation and trade diversion. Robinson *et al.,* (1993) suggest that the impact depends on the export capacity of the partner country and whether the partner country faces constant costs. Panagariya (1998) argues that an RTA can be net trade-creating in one sector and net trade-diverting in another sector. What is common in these studies is that they analyse macro-economic, welfare and sectoral impacts and very limited analysis on trade creation and diversion.

The literature on RTA using gravity models dwells more on determinants of trade and less on trade creation and diversion. Zarzoz and Lehmann (2003) apply a gravity model to assess Mercosur-European Union trade and the trade potential following trade agreements between the two blocs and establish that belonging to either bloc fosters trade. Laaser and Schrader (2006) analyse the Baltic trade flows and establish a strong trade link between Estonia, Lativia, Lithuania and the European Union (EU) suggesting trade creation following their joining the EU common market. Foroutan and Pritchett (1993) looks at intra-trade in Sub Saharan African and concludes that despite the proliferation of RTA in Sub Saharan African there is very limited intra-trade suggesting limited trade creation. Cernat (2001) assesses regional trade arrangement in South-South RTAs (AFTA, CARICOM, COMESA, ECOWAS, MERICOSUR and SADC) and establishes that contrary to the feared negative impacts they are not more trade diverting than other RTAs. Buigut (2012) estimates the trade effect of the EAC customs union on each individual member and concludes that the customs union has generated disproportionate impact of intra bloc exports and imports for individual members. The evidence is thus inconclusive requiring further work.

3. The Gravity Model

The application of the gravity model to assess and analyse international trade flows was first applied in the 1960s and since then, the models have been widely used. Early studies using gravity models (Tinbergen, 1962; Poyhonen, 1963; and Linnemann, 1966) were *ad hoc,* and lacked solid theoretical foundations. The application of gravity models to economic interchange and trade was in the past criticised as lacking basis and foundation from trade theory (Matyas *et al.* 2000). It was argued that the model lacked the ingredients of the prominent models of international trade that included the Ricardian model, (differences in technology) and the Heckscher-Ohlin (HO) model (differences in factor endowments) as the basis for trade (UNCTAD and WTO, 2012). This view has so far been reconsidered owing to more enlightening empirical work and details as reviewed in Shinyekwa and Othieno (2013). Specifically, the works of Anderson (1979), Bergstrand (1990), Deardorff (1998), and Feenstra, *et al,* (1998) have since resolved this problem providing relevant trade theories.

The debate now as explained by Baldwin and Taglioni (2006) is on the errors that different specifications of the gravity model face in the literature. The three errors are referred to as the gold, silver and bronze medal errors. Respectively they refer to the multilateral resistance terms which are always omitted and yet they are correlated with trade costs, averaging the reciprocal trade flows (Note 2), and inappropriate deflation of trade flows. Baldwin and Taglioni (2006) extensively reveals the problems and suggests how these problems can be addressed which the current study adopts. We use direction specific data (exports) and not averaged bilateral trade data based on trade theory that asserts that gravity models hold for each and every uni-directional trade flow. Cernat (2001) argues that using bilateral trade flows as a dependent variable for a given pair of countries fails to discriminate the impact of RTA formation on exports from non-member to RTA members and exports from the RTA members to the non-member.

We use the log-linear form of the gravity equation to estimate the trade creation and diversion effects of the EAC RTA, using a panel regression analysis. We use the export trade flows as the dependent variable, in log form, from country i to country j at a given time t – 2001- 2011. The gravity equation demonstrates the relationship between the natural logarithm of the monetary value of trade between two countries and the log of their

respective GDPs, a composite term measuring barriers and incentives to trade between them.

$$X_{ijt} = f(Y_{it}, Y_{jt}, D_{ij}) \qquad (1)$$

Where X_{ijt} are exports from country i to country j at time t. Y_{it} and Y_{jt} are the GDPs at time t of country i and j, respectively (Note 3) The distance between the two capital cities of the two countries is defined as D_{ij}. Therefore bilateral trade flows are dependent upon the size of the two economies and the distance between them. Whereas a high level of income in the exporting country indicates a high level of production leading to more products for export, high level of income in the importing country suggests higher demand and therefore, higher imports. In this case, both Y_{it} and Y_{jt} are positively correlated with the level of bilateral exports. $Yppc_{it} + Yppc_{jt}$ are the per capital incomes at time t of country i and j, respectively. The choice of the per capita income is meant to reflect the population impact that is implied in the effective demand for commodities among the trading partners. In this case, both $Yppc_{it} + Yppc_{jt}$ are positively correlated with the level of bilateral exports. The coefficient for distance is expected to be negative since distance increases transport costs. Finally, ε_{ij} is the log normally-distributed error term. For estimation purposes, the basic gravity model is most often used in its log-linear form. We interpret the parameters of the estimated equation in logarithms as elasticities as specified in equation 2.

$$In(X_{ijt}) = \alpha + \beta_i In(Y_{it}) + \beta_j In(Y_{jt}) + \beta_i In(Yppc_{it}) + \beta_j In(Yppc_{jt}) + \beta\ In\ (D_{ij}) + \varepsilon_{ij} \qquad (2)$$

It is common to expand the basic gravity model by adding other variables, which are thought to explain the impact of various policy issues on trade flows. Traditionally, the augmented version of the gravity model assessing the impact of RTAs has dummies for islands, landlocked countries and common borders. According to UNCTAD and WTO (2012) they reflect the fact that transport costs increase with distance and that they are higher for landlocked countries and islands but are lower for neighbouring countries. The coefficients for the land locked and islands dummy variables are expected to be negative while the common border is positive due to proximity. Other dummy variables are used to capture information costs and these include common language, adjacency or other relevant cultural features such as colonial history. $In(RER_{ij})_t$ that denotes the real exchange rate between Uganda and trading partners calculated as the average of the national currency unit of country j per US dollar divided by the annual average of the national currency unit of i per US dollar.

The variable of interest is the RTA, taking two countries i and j in a common RTA (for example Uganda and Kenya) and country k (Zambia) that is not. If i imports more from j and less from k following integration, then trade diversion will have taken place. On the other hand if i imports more from j and k, following integration, then trade creation is said to have taken place. A number of approaches have been proposed to model trade creation and diversion effects of an RTA: UNCTAD and WTO (2012) and Cernat (2001) propose that if i and j are members of the RTA at time t we assign them *one* and *zero* otherwise (k). This dummy is intended to capture the increase in exports from EAC members as a result of RTA formation. This means that Uganda, Kenya, Tanzania, Burundi and Rwanda take the value of *one* (also referred to as *bothinEAC*). Countries out of the EAC region will take *zero*. The other dummy captures trade between a member of the EAC and trading partners outside the EAC, which is given *one* and *zero* for trade between both countries outside the EAC. We will refer to this dummy as *oneinEAC*. The dummy is intended to approximate the change in exports from third countries to the EAC member as a result of formation of the EAC. In case of a decrease in exports from more efficient third country exporters (k), this variable is interpreted as trade diversion. However, if there is an increase in exports from third countries as a result of EAC formation this dummy should be interpreted as trade creation. Therefore when both coefficients are positive and significant it suggests that trade creation has taken place. However, when the *bothinEAC* is positive but *oneinEAC* is negative it means trade diversion has taken place. This implies that the interpretation of the two dummy variables can be done jointly. Including all the other variables leads to the following specification:

$$In(X_{ijt}) = \alpha_0 + \beta_1 In(Y_{it}) + \beta_2 In(Y_{jt}) + \beta_3 In(Yppc_{it}) + \beta_4 In(Yppc_{jt}) + \beta_5 In(D_{ij}) + \beta_6 border + \beta_7 llocked + \beta_8 lang + \beta_9 island + \beta_{10} bothinEAC + \beta_{11} oneinEAC + \beta_{12} In(RER_{ij})_t + \varepsilon_{ij} \qquad (3)$$

4. Data Types and Sources

We obtained export trade data from the COMTRADE and World Integrated Trade Solutions (WITS) database. We included seventy five countries (Annex Table A1) which mainly trade with the EAC partners based on the value of trade that exist among them. The data for distances were extracted from the distance calculator website (Note 4). The GDP, per capita income, and real exchange rate data were taken from the Development Indicators (WDI) of the World Bank. The data on whether, a country is land locked or not, is an island or not, borders a trading partner or not and has the same official language or not were extracted from the CEPII) (Note 5) gravity dataset. The analysis is done for the period 2001 to 2011.

5. The Diagnostics and the Estimation Procedure

We use the Hausman test to choose between the Fixed Effects (FE) and Random Effects (RE) and the preferred model is diagnostically RE. We then proceed to conduct the Breusch-Pagan Langrange Multiplier (LM) test to decide between a RE regression and a simple OLS regression of which the former is the appropriate model to estimate. We include a lag of exports since bilateral agreements and trade preferences are likely to have a lag hence the need to apply dynamic models. The progressive implementation of the EAC treaty and protocols is captured by this lag and a dummy variable breaking the period into two: 2001-2004 during the Free Trade Area phase and 2005 – 2011during the CU phase. We checked for multi-collinearity in the model by conducting the simple correlation test that reveals the coefficients between the explanatory variables. Results demonstrated that the values of the correlation coefficients between explanatory variables do not exceed 0.3. We conducted Unit root tests to determine a potentially co-integrated relationship between the variables. When all the variables are stationary, the traditional estimation methods can be used to estimate the relationship between the variables. However if the variables are non-stationary, a test for co-integration is required. We conducted the Levin *et al.* (2000) test of panel unit roots that assume that the autoregressive parameters are common across countries. Levin, Lin and Chu (LLC) used a null hypothesis of a unit root that states that the panels contain unit roots and the alternative that the panels are stationary. The test results indicate that all variables are stationary (the null unit root is rejected). As a result of this the co-integration test is not required to estimate the model.

6. Empirical Results and Discussions

Following the implementation of the EAC CU in 2005 the value of intra-EAC trade steadily increased and more than doubled from US$1.8 billion in 2004 to US$5.5 billion in 2012. This is reflected in the share in total EAC trade which improved from 7.8 percent to 11.4 percent (WTO, 2012), although significant differences exist with respect to specific member states. Table 1 demonstrates that Kenya is the largest contributor to intra-EAC exports and Uganda is the largest regional importer. Kenya overall contributed to an average share of over 40 percent of total intra-EAC trade and enjoyed a trade surplus with its EAC partners during the period.

Table 1. Intra-trade flows in the EAC regional (Exports and Imports 2004–2012 in US$ Millions)

	2004	2005	2006	2007	2008	2009	2010	2011	2012
Uganda	132	145	153	275	377	399	609	637	746
Tanzania	124	129	158	206	260	324	394	417	520
Kenya	810	974	736	952	1,213	1,167	1,279	1,545	1,580
Rwanda	25	35	33	40	46	47	55	81	344
Burundi	5	4	6	6	7	6	13	24	16
Total	1,096	1,287	1,085	1,479	1,903	1,943	2,349	2,704	3,206
Imports									
Uganda	416	552	430	531	571	547	621	724	676
Tanzania	138	161	176	110	205	317	296	378	679
Kenya	38	62	84	192	182	162	257	303	361
Rwanda	69	99	143	209	394	450	341	385	448
Burundi	54	59	61	80	85	129	89	267	147
Total	716	931	894	1,121	1,437	1,605	1,603	2,057	2,311

Data Source: East African Community Facts and Figures - 2012. Arusha, Tanzania. EAC Secretariat, 2012

On the other hand total EAC trade with the rest of the world has continued to be dominated by EAC partner states importing high technology manufactures from the rest of the world. The goods are mainly imported from the European Union, United States of America, Asia and other African countries. According to (WTO, 2012), the value of EAC trade with the rest of the world fell from US$31 billion in 2008 to US$28.8 billion in 2009. This is explained by the global economic crisis on both imports and exports. However, when the value of trade with the rest of the world is compared to the intra EAC – standing at only US$5.5 billion in 2011, the partner states have a long way to go to increase their intra-regional trade.

Table 2 gives the estimation results of the impact of the EAC RTA on trade specifically trade creation and diversion. The dependent variable is the log of real exports. Both the static and dynamic RE estimations models have similar results and their explanatory power is quite high and reasonable. The overall R-Squared for the static RE is 0.53 and 0.56 for the dynamic RE suggesting that more than a half of the variation in trade flows is explained by the variables used in the model. The Wald chi2 test (for panel models) clearly shows that the model is a good predictor (goodness of fit) with the probability of less than one percent. Whereas under the static RE, a 10 percent increase in the per capita income of the exporters increases trade by 2 percent, the dynamic models estimates a 1.7 percent increase in trade. The income elasticities (GDP) are positive and highly significant clearly demonstrating that GDP is highly correlated with trade flows.

Table 2. Trade creation and diversion effects of the EAC customs union

Variable	RE Static	Std Errors	RE Dynamic	Std Errors
Exporter per capita income	0.209***	0.013	0.172***	0.012
Importer per capita income	-0.058***	0.012	-0.073***	0.012
Exporter GDP	1.543***	0.012	1.221***	0.013
Importer GDP	1.269***	0.011	1.274***	0.011
Distance	-0.811***	0.023	-0.788***	0.022
Area	0.028**	0.009	0.031***	0.009
Contingency	0.987***	0.101	0.847***	0.098
Common Official language	0.843***	0.048	0.876***	0.046
Common Colony	-0.005	0.058	-0.032	0.056
Landlocked	-0.046	0.048	-0.058	0.046
Island	0.66***	0.052	0.572***	0.051
Dummy Intra-EAC	6.897***	0.280	7.018***	0.270
Dummy Extra-EAC	0.534***	0.075	0.227**	0.072
Dummy Customs Union	0.569***	0.035	0.384***	0.034
Real Exchange Rate	-1.681***	0.112	-1.328***	0.109
Lag of exports	-	-	0.213***	0.003
Constant	-42.08***	0.654	-38.84***	0.635
R squared overall	0.527		0.557	
R squared between	0.976		0.99	
R squared within	0.522		0.552	
Number of observations	60214			
Number of groups	11		11	
Wald chi2(15)	67065.81		75753.27	
Probability > chi2	0.0000		0.000	

: * p<0.05, ** p<0.01, *** p<0.00

A 10 percent increase in GDP for the exporters leads to a 15 percent increase (static RE) and 12 percent (dynamic) in exports. Similarly an increase in the GDP of the importers by 10 percent leads to 13 percent in export trade under both static and dynamic RE models. It thus emerges as it is conventionally established that when countries increase their incomes they are likely to trade more.

The distance to the importers capital city is highly significant and negative conforming to theory that distance is associated with transport and distribution costs in international trade. As distance in kilometres increases by 10 percent, trade reduces by 8 percent in all the models. The EAC region exports commodities to the European Union and other far areas which increases transaction costs. Although the size of the country is highly significant,

the coefficient is quite small with probably a small impact. As the sizes of different country differ by a margin of 10 percent, trade marginally increases by less than 1 percent. It is not all about the size of the country but the size of the economy (GDP) that matters most. For that matter small countries with advanced technology in manufacturing, trade more than large countries relying on commodities for exports.

The lagged exports (dynamic model) is statistically significant (less than 1 percent), moreover with the expected positive signs. Increase in trade in the previous period increases trade in the current period by 2 percent and this is in agreement with growth in intra-EAC trade discussed earlier. In the context of the analysis, the EAC trade agreement signed by partner states is taking effect by generating more trade over time. This is further underlined by the variable that estimates the impact of the EAC CU. The coefficient value of 0.57 (Note 6) (static RE) and 0.38 (dynamic RE) translate into 77 and 46 percent increase in trade respectively. Implementation of the EAC CU has thus increased intra-EAC export trade.

Movements in the real exchange rate affect trade flows as the estimated coefficient is negative and highly significant. A 10 percent appreciation in the real exchange rate of the exporter country reduces exports by 17 percent (static RE) and 13 percent (dynamic RE). This implies that depreciation (devaluation) of the exporter country likewise increase exports by similar magnitudes.

Trading with a neighbour with a similar border increases chances of trade significantly. The coefficient value of 0.987 (Note 7) (static RE) and 0.847 (dynamic RE) translate into 168 and 133 percent increase in trade respectively. The EAC is bordered by seven countries and regional trade is not only increasing among the partner states but also its non-member neighbours. The dummies of common colony and land locked are insignificant in all the models estimates. However islands owing to their proximity and access to trade routes and facilities increase the amount to trade between partner states. Being an island increases trade by 93 percent (static RE) and 77 percent (dynamic RE). Concerning the official language, results suggest that having the same official language among a pair of trading partner increases trade by 140 percent (static RE) and 132 percent (dynamic RE). The overall picture suggested by the dummies is that exports are likely to reduce with distance, increase with proximity, reduce with poor access and increase with ability to communicate.

The empirical question is whether the EAC regional integration is creating or diverting trade. Results reveal that the EAC regional integration is creating trade since the coefficients for Intra-EAC is positive and highly significant. It shows that intra-EAC trade has significantly increased over time. Furthermore, the variable Extra-EAC is positive and significant showing that EAC partner states trading with non-partners increases trade. In other words under the EAC agreement trade creation effects far out way the trade diversion effects. With regard to the research question, it is evident that regional integration is helping to increase intra-regional trade. The measures undertaken to promote trade like reduction of internal tariffs, reduction of non-tariff barriers and adoption of a common external tariff have yielded positive results.

7. Conclusions

The paper investigated the potential impact of south to south Regional grouping on trade creation and diversion. We used an expanded (augmented) gravity model to estimate the impact of the EAC treaty implementation on trade among partner state and non-partner states. Panel gravity models for trade are conventionally estimated using bilateral trade flows that generate results that are prone to three the errors explained Baldwin and Tagloni (2006). The paper instead adopted export data to overcome this problem. Using export data from 2001 to 2011 on 70 countries that trade mainly with the EAC partner states, the study establishes that the EAC region has indeed created trade contrary to widely held views that South-South RTAs largely divert trade. There is thus evidence that the EAC, a south-south RTA has been a more trade creating than a trade diverting as espoused in the literature. The rest of the gravity model variables conform to theory and are significant.

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Notes

Note 1. Trade diversion occurs when a free trade area (in this case the EAC CU) shifts (diverts) trade, away from a more efficient supplier outside the EAC region, towards a less efficient supplier within the FTA, for example Kenya, Tanzania, Burundi and Rwanda. This is likely to reduce Uganda's national welfare, however in some instances the national welfare may improve despite the trade diversion. Trade creation occurs when a free trade area (in this case the EAC CU) increases (creates) trade that would not have existed otherwise without the formation of the FTA. In this case as a result, supply will come from a more efficient producer of the concerned product. Gains occur if higher-cost domestic production is replaced by cheaper imports from one/all EAC partner states. Unlike trade diversion, in all cases trade creation raises a country's national welfare.

Note 2. The basic theory of the gravity equation is a modified expenditure function, that is, it gives us the value of expenditure by a country on goods produced by another country. This implies that the gravity model explains uni-directional bilateral trade. However, most gravity models estimated use the average of the two-way exports between the two countries.

Note 3. Later in the model we will define another country k to represent countries outside the EAC RTA.

Note 4. http://www.timeanddate.com/worldclock/distanceresult.html?p1=115&p2=17

Note 5. CEPII make available a "square" gravity dataset for all world pairs of countries, for the period 1948 to 2006. This dataset was generated by Keith Head, Thierry Mayer and John Ries to be used in the following paper: HEAD, K., T. MAYER AND J. RIES(2010).

Note 6. The model is estimated in natural logs therefore all dummy variables are given a value of one in natural logs when the correspondent condition is satisfied and a value of zero otherwise. To obtain the percentage change the coefficients are computed as follows: [(EXP (0.598)-1)*100} and [(EXP (0.384)-1)*100}.

Note 7. To obtain the percentage change the coefficients are computed as follows: [(EXP(0.987)-1)*100}.

Appendix

Table A1. The countries that are included in the study

Argentina	Ethiopia	Malaysia	Singapore
Australia	Finland	Malawi	South Africa
Austria	France	Mauritius	Spain
Bahrain	Germany	Mozambique	Sri Lanka
Bangladesh	Greece	Netherlands	Sudan
Belgium	Hong Kong, China	New Zealand	Swaziland
Botswana	Hungary	Nigeria	Sweden
Brazil	India	Norway	Switzerland
Bulgaria	Indonesia	Oman	Thailand

Burundi	Iran (Islamic Republic of)	Pakistan	Turkey
Canada	Ireland	Philippines	Uganda
China	Israel	Poland	Ukraine
Chinese Taipei	Italy	Portugal	United Arab Emirates
Congo	Japan	Qatar	United Kingdom
Czech Republic	Jordan	Republic of Korea	Tanzania
Côte d'Ivoire	Kenya	Romania	United States of America
DR. Congo	Kuwait	Russia	Zambia
Denmark	Libya	Rwanda	Zimbabwe
Egypt	Luxembourg	Saudi Arabia	

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